

REMARKS

This Amendment is responsive to the Office Action dated November 14, 2008.
Applicant has added claims 37–39. Claims 1–10, 21 and 23–39 are pending.

Amendments to the Specification

The specification has been amended at paragraph [0141] to further describe FIG. 24. Paragraph [0141] as amended specifies that, as shown in FIG. 24, the gaps in the ground plane may extend outward to more than two different edges of the ground plane. In addition, paragraph [0141] states that, in the example shown in FIG. 24, each of the gaps 140A–140D extends outward from a central region of ground plane 130 to an edge of ground plane 130 to form a plurality of interruptions in a periphery of ground plane 130. No new matter has been added by way of the amendment to paragraph [0141] because the amendments merely provide written description of features shown in FIG. 24 as originally filed with the present application.

Paragraph [0141] as amended also states that the loop-like structure 110 of internal antenna 32 is arranged over antenna circuit board 106 such that at least some of gaps 140A–140D are in substantial overlapping alignment with internal antenna 32. Support for this amendment to paragraph [0141] may be found throughout Applicant's disclosure, such as at FIGS. 12, 13, and 23–25. FIGS. 12, 13, and 23 illustrate the relative alignment between loop-like structure 110 of antenna 32 and antenna circuit board 106. FIG. 25 illustrates an aperture 143 that approximates the size and shape of the aperture of the antenna loop 110.¹ In addition, ground plane 130, including gaps 140A–140D, is shown in FIGS. 24 and FIG. 25, which illustrate that portions of gaps 140A–140D are in substantial overlapping alignment with antenna loop 110.

Claim Rejection Under 35 U.S.C. § 103(a)

In the Office Action, claims 1–4, 21 and 35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Pesola et al. (U.S. Patent No. 5,271,056, hereinafter "Pesola") in view of Maoz et al. (U.S. Patent Application Publication No. 2004/0125029, hereinafter "Maoz"). In addition, claims 9 and 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Pesola in view of Maoz as applied to claim 1 above, and further in view of Stein et al. (U.S.

¹ Applicant's disclosure at paragraph [0144].

Patent Application Publication No. 2004/0230246, hereinafter “Stein”). Claims 5–8, 23–29, 32–34 and 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Pesola in view of Maoz as applied to claim 1 above, and further in view of Persson (U.S. Patent No. 6,207,912). Claims 30 and 31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Pesola in view of Maoz in view of Persson as applied to claim 23 above, and further in view of Stein. Applicant respectfully traverses these rejections. The applied references fail to disclose or suggest the inventions defined by Applicant’s claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

Examples of Applicant’s invention are directed to programmers for implanted medical devices (IMDs) in which an antenna circuit board includes a substantially contiguous ground plane layer interrupted by a plurality of gaps. In some examples, the antenna circuit board also includes a signal plane with an electrostatic discharge layer (ESD) that defines a peripheral conductive layer and a central aperture. In examples including such an ESD layer arrangement, the antenna may have a loop-like structure that defines a central aperture with the central aperture of the ESD layer in substantially overlapping alignment with the aperture of the loop-like antenna.²

Arranging the IMD circuit boards and associated components as disclosed and claimed in the present application functions to promote telemetry performance by balancing two competing objectives. First, a single, contiguous ground plane area is desirable to provide a low impedance return path for electrical signals transmitted via traces on signal planes.³ A single, substantially contiguous ground plane serves to maximize RF signal integrity.⁴ Second, it is desirable to present a minimal magnetic load to the magnetic circuit operating on the antenna.⁵

To achieve a working compromise between RF and magnetic requirements, the contiguous ground plane is divided into smaller areas by a plurality of gaps to minimize magnetic loading of the antenna.⁶ In some cases, the gaps divide adjacent conductive plane areas of the ground plane to prevent large eddy currents from forming around the periphery of the

² Applicant’s disclosure at paragraph [0137].

³ Applicant’s disclosure at paragraph [0136].

⁴ Applicant’s disclosure at paragraph [0136].

⁵ Applicant’s disclosure at paragraph [0137].

⁶ Applicant’s disclosure at paragraph [0139].

antenna circuit board because there are no conductive loops around the periphery of the board.⁷ Preventing large eddy currents from forming reduces the magnetic load on the antenna.

In addition to subdividing the ground plane with a plurality of gaps, reduction or elimination of surface area of conductive signal planes within the antenna aperture serves to reduce the magnetic load to the magnetic circuit of the antenna.⁸ In other words, forming signal planes that define apertures in alignment with the aperture of antenna can substantially reduce the magnetic load on the antenna.⁹

Independent Claim 1

The applied references lack any teaching that would have suggested a programmer for an implantable medical device that includes, among other things, an internal antenna mounted on a first circuit board that includes a substantially contiguous ground plane layer interrupted by a plurality of gaps, and a display device mounted on a second circuit board, as recited by Applicant's claim 1.

In support of the rejection of claim 1, the Office Action proposed modifying the mobile wireless device disclosed by Pesola with the circuit board 4 disclosed by Maoz, which includes a ground plane with a pair of slots 53a, 53b. Applicant disagrees that a person having ordinary skill in the art would have looked to Maoz to modify Pesola and arrive at Applicant's claimed programmer. "If the proposed ... combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious."¹⁰ Combining Pesola with Maoz would change the principle of operation of Pesola, and, thus, the combination of Pesola in view of Maoz is insufficient to render Applicant's claim 1 obvious.

Pesola is directed to a cellular (or radio) telephone that is constructed to reduce electromagnetic interference (EMI) between adjacent electronics within the phone. The EMI-shielding disclosed in Pesola is achieved by an electrically conductive frame plate with raised edges on both sides of the plate and the ground planes of two circuit boards.¹¹ The frame plate is

⁷ Applicant's disclosure at paragraph [0141].

⁸ Applicant's disclosure at paragraph [0137].

⁹ Applicant's disclosure at paragraph [0137].

¹⁰ Manual of Patent Examining Procedure § 2143.01 (8th ed. rev. 7, 2008) (citing *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)).

¹¹ Pesola at Abstract, col. 2, ll. 13-15 and ll. 25-29.

electrically connected to the ground foils of the printed circuit boards.¹² Each circuit board is arranged on either side of the frame plate¹³ such that the components of each circuit board face the frame plate¹⁴ and are essentially contained in a metallic electrically conductive box that provides EMI-shielding for the circuit board components.¹⁵

Maoz is directed to a cellular telephone (or mobile communication apparatus) with a ground plane that is extended, i.e., enlarged by an electrically conductive reflector to increase the load on the telephone antenna.¹⁶ The reflector is connected to the ground opposite the end where the antenna is arranged.¹⁷

The telephone disclosed in Pesola is configured to provide EMI-shielding between internal components in a simpler and less expensive construction than previous designs.¹⁸ Pesola specifically teaches that the EMI-shielding between two circuit boards is formed by a “frame plate together with ground foils of the printed circuit boards.”¹⁹ As would have been clear to one of ordinary skill in the art at the time of Applicant’s invention, modifying Pesola with the ground plane disclosed by Maoz would change the principle of operation of Pesola. The slots in the ground plane layer of Maoz would reduce EMI-shielding of the Pesola frame and circuit board arrangement. For example, the slots 53a, 53b in the Maoz ground plane would provide pathways for EMI to be transmitted to and from the very circuit board components that Pesola is attempting to shield with the electrically connected frame plate and ground planes. Indeed, one having ordinary skill in the art looking to modify Pesola would have avoided any modifications that would reduce the EMI shielding of the Pesola frame plate and circuit board arrangement.

For at least these reasons, the combination of Pesola with Maoz is improper and does not render claim 1 obvious under 35 U.S.C. § 103(a).

¹² Pesola at col. 2, ll. 27–29 and ll. 49–52.

¹³ Pesola at col. 1, ll. 40–47.

¹⁴ Pesola at col. 1, ll. 53–55.

¹⁵ See, e.g., Pesola at col. 2, ll. 52–58.

¹⁶ See Maoz at Abstract and paragraph [0011].

¹⁷ See Maoz at paragraph [0012].

¹⁸ See, e.g., Pesola at col. 1, lines 34–40.

¹⁹ Pesola at Abstract (“The frame plate together with ground foils of the printed circuit boards form EMI-shielding for the components located on the sides of the printed circuit boards which face the frame plate.”).

Independent Claim 23

Applicant respectfully disagrees that an ordinarily skilled artisan would have combined Pesola with Maoz to arrive at the programmer recited in Applicant's independent claim 23, because, as explained with reference to claim 1, combining Pesola with Maoz would undermine the principle of operation of Pesola. Notwithstanding the impropriety of combining Pesola with Maoz, the applied references alone or in the manner combined in the Office Action, fail to teach or suggest at least one element of claim 23 and, therefore, cannot render claim 23 obvious under 35 U.S.C. § 103(a). For example, the references, alone or in combination fail to disclose a programmer including a first circuit board that includes at least one signal plane with an ESD layer defining an aperture in substantially overlapping alignment with an aperture defined by a loop-like antenna, as required by claim 23.

Claim 23 was rejected as unpatentable over Pesola in view of Maoz and further in view of Persson. The Office Action acknowledged that Pesola and Maoz fail to disclose a circuit board including an ESD layer. The Office Action looked to Persson to cure this deficiency in Pesola in Maoz.²⁰ The Office Action failed to identify the specific element in Persson that is considered to be an ESD layer. If the Office Action is referred to the domefoil 50, which provides an electrostatic seal between a telephone keypad and circuit board,²¹ Applicant respectfully disagrees that the domefoil 50 is an ESD layer in accordance with Applicant's claim 23. Persson does not disclose or suggest that the domefoil 50 defines an aperture, as required by Applicant's claim 23. To the contrary, Persson suggests the desirability of removing apertures from the ESD layer, and thereby teaches away from the features of Applicant's claim 23.²² Persson explicitly states that the domefoil 50 is formed as a sheet fully covering the entire surface between the keypad 30 and underlying circuit board.²³

Moreover, Persson (or any other cited reference for that matter) fails to disclose any connection between an antenna and the domefoil 50. Claim 23, on the other hand, requires a specific arrangement between an ESD layer and a loop-like antenna. To the extent Persson even

²⁰ Office Action at pp. 4-5, item 13.

²¹ Persson at col. 3, ll. 17-23.

²² Persson at col. 3, lines 27-34 ("*In contrast to the prior art domefoil 40 in FIG. 2, the inventive domefoil 50 has no open-air openings which would permit an electric spark to be transferred from a key 32 to the circuit board 20. All previous openings, such as the openings for the illuminating means 24, are covered with additional domes 54 of a non-conductive material isolating the circuit board 20 from the keypad 30.*") (emphasis added).

²³ Persson at col. 3, ll. 20-53.

discusses an antenna, Persson merely states that its telephone includes an antenna 13.²⁴ Persson does not state how the antenna is arranged relative to an ESD layer, much less an ESD layer of a circuit board on which the antenna is mounted.

The Office Action does not appear to properly consider the present invention as claimed and fails to establish a *prima facie* case of obviousness with respect to independent claim 23. To support a rejection under 35 U.S.C. § 103, the reason(s) why the claimed invention would have been obvious must be clearly articulated. The Supreme Court has noted that the analysis supporting an obviousness rejection should be made explicit.²⁵ The Federal Circuit has stated that “rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”²⁶ Additionally, “[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art.”²⁷

The Office Action fails to establish *prima facie* obviousness. For example, the Office Action fails to articulate any rational reason why, having considered all the claimed limitations, the references relied on render claim 23 obvious. Additionally, the Office Action fails to consider the actual claim language with respect to the cited references or explain where or how the references teach or suggest the invention embodied therein. For example, the Office Action fails to properly consider the recitation of claim 23 that the internal antenna has a loop-like structure that defines a first aperture, and that the first circuit board includes at least one signal plane with an ESD layer defining a second aperture in substantially overlapping alignment with the first aperture. In support of the rejection of independent claim 23, the Office Action states simply that “since the [ESD] layers [disclosed by Persson] are throughout the entire circuit board then it would be obvious that the electrostatic discharge layers would be the approximate size and shape of the antenna.”²⁸ This statement, however, reflects a misreading of Applicant’s claim 23.

Applicant notes that claim 23 does not require an ESD layer that approximates the size and shape of an antenna, but an ESD layer that defines an aperture that is in substantially overlapping alignment with an aperture defined by an internal antenna. It is unclear how an ESD

²⁴ See Persson, col. 3, line 4 (this is the only mention of an antenna in the entire reference).

²⁵ *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1396 (2007).

²⁶ *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006).

²⁷ M.P.E.P. § 2143.03 (quoting *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)).

²⁸ Office Action dated November 14, 2008 at p. 6, item 13.

layer “throughout the entire circuit board” defines an ESD layer that defines an aperture, much less an ESD layer that defines an aperture that is in substantially overlapping alignment with an aperture define by an internal antenna. Persson fails to even suggest that its device includes an internal antenna that defines an aperture. Thus, it is unclear how any ESD layer disclosed by Persson defines an aperture that obviously approximates the size and shape of an aperture defined by an antenna, as asserted by the Office Action.

Applicant’s claim 23 recites a specific relationship between an ESD layer and an aperture defined by an antenna. The cited references fail to disclose or even suggest the claimed relationship, as well as an ESD layer that defines an aperture. Moreover, the Office Action fails to provide any reasons for modifying the ESD layer disclosed by Persson to define an aperture that is in substantially overlapping alignment with an aperture define by an internal antenna. For at least these reasons, independent claim 23 is patentable over Persson.

Dependent Claims

Claims 2–10, 21, 33, and 35 depend from independent claim 1 and claims 24–32, 34, and 36 depend from independent claim 23. For at least the reasons discussed above, claims 1 and 23 are patentable over the cited references. Accordingly, the dependent claims are also patentable over the cited references. Moreover, the dependent claims recite limitations that are neither disclosed nor suggested by the cited references.

For example, claim 3, which depends from claim 1, specifies that the gaps divide adjacent ground plane regions to disrupt flow of eddy currents within the ground plane layer. Pesola in view of Maoz fails to teach or suggest a contiguous ground plane interrupted by a plurality of gaps that are arranged to disrupt flow of eddy currents within the ground plane layer as required by claim 3.

As recognized by the Office Action, Pesola does not disclose a contiguous ground plane interrupted by outwardly extending gaps. Maoz does not disclose a ground plane that includes gaps that are arranged to disrupt flow of eddy currents within the ground plane layer. Instead, the slots in the Maoz ground plane are a means of attaching an extension, “reflector” to the ground plane layer.²⁹ The reflector that is attached to the ground plane and that defines the gaps

²⁹ See, e.g., Maoz at paragraph [0043].

cited in the Office Action functions to increase the load on the antenna. Nowhere does Maoz teach any relationship between the gaps and eddy currents.

Claims 5 and 6, which depend from claim 1, specify that the first circuit board includes an ESD layer defining a peripheral conductive layer and a central aperture, the internal antenna defines an aperture, and the central aperture of the ESD layer substantially approximates a size and shape of the aperture of the antenna. Claim 7, which also depends from claim 1, specifies that the ESD layer is a first ESD layer formed on a first side of the ground plane layer, the programmer further comprises a second ESD formed on a second side of the ground plane layer. Claim 8, which also depends from claim 1, specifies that the second ESD defines a second central aperture that substantially approximates a size and shape of the central aperture of the first ESD.

The Office Action indicated claims 5–8 were obvious in view of Pesola and Maoz, in further view of Persson. Applicant respectfully disagrees. As discussed above with respect to claim 23, neither Pesola nor Maoz or Persson discloses or suggests an ESD layer defining an aperture. Moreover, the cited references fail to disclose or suggest an ESD layer defining an aperture that approximates a size and shape of an antenna aperture, as recited by Applicant's claim 6.

It should be noted that while each of the references relied on in the Office Action may have been discussed separately in portions of this Amendment, that does not mean that they have been analyzed individually for purposes of the patentability of the claims under 35 U.S.C. § 103(a). The distinctions drawn between a particular reference and the claims apply to that reference and the reference combined as suggested in the Office Action. In other words, it is not accurate to state that any of the above arguments are incorrect because, for example, Pesola has been considered individually instead of in combination with Maoz. The references have been considered individually and in combination with the other references relied on in the Office Action and still fail to teach or suggest the subject matter recited in and thereby fail to render obvious any of claims 1–10, 21 and 23–36.

For at least these reasons, the Examiner has failed to establish a *prima facie* case for non-patentability of Applicant's claims 1–10, 21 and 23–36 under 35 U.S.C. § 103(a). Reconsideration and withdrawal of the rejection of the claims is respectfully requested.

New Claims

Applicant has added claims 37-39 to the pending application. The applied references fail to disclose or suggest the inventions defined by Applicant's new claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed inventions. As one example, the references fail to disclose or suggest that a programmer including an internal antenna mounted on a circuit board that includes a substantially contiguous ground plane layer interrupted by a plurality of gaps, where a portion of at least some of the gaps is in substantial overlapping alignment with the internal antenna, as recited by claim 39.

No new matter has been added by the new claims 37-39, which find their support throughout Applicant's application, such as at FIG. 24 and paragraph [0141].

CONCLUSION

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

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